Troubleshooting Guide - GC

Excessive Baseline Noise

Possible Cause	Solution	Comments
Injector contamination	clean the injector	gas lines may need cleaning
Column contamination	Bake out the column Solvent rinse the column	Limit bake out to 2 hrs. Bonded and cross linked phases only
Detector contamination	clean the detector	noise increases over time, and not suddenly
Contaminated or low quality gases	use better grade gases check for gas leaks and expired gas traps	usually occurs after changing a gas cylinder
Incorrect detector gas flow rates	adjust flow rates to recommended values	consult literature
Leak when using MS, ECD, or TCD	find and eliminate the leak	usually at the column fittings or injector
Old detector filament, lamp, or multiplier	replace appropriate part	use new part
Un-equilibrated detector	allow detector to stabilize	may require up to 24 hrs to fully stabilize
Incompletely conditioned column	fully condition column	critical for trace level analyses

Change in Peak Size

Possible Cause	Solution	Comments
Change in detector response	Check gas flows, temperatures, and settings. Check background level or noise	All peaks may not be equally affected. May be caused by system contamination and not the detector
Co-elution	Change column temperature or stationary phase	Decrease column temperature and check for appearance of a peak shoulder or tail
Change in the purge activation time	Check the purge activation time	For splitless injection
Change in the injection volume	Check injection technique	Injection volumes are not linear
Change in sample concentration	Check and verify sample concentration	Sample degradation, variances in sample temperature or ph
Leak in the syringe	Use a different syringe	Sample leaks passed the plunger or around the needle, Leaks are often not readily visible
Column contamination	Trim the column Solvent rinse the column	Remove about half to 1 meter from the front of the column. Only bonded and cross linked phases
Column activity	Irreversible	Only affects active compounds

Tailing Peaks

Possible Cause	Solution	Comments
Column contamination	Trim the column Solvent rinse the column	Trim half to 1 meter from the front of the column Only for bonded and cross linked phases
Column activity	Irreversible	Only affects active compounds
Solvent-phase polarity mismatch	Change sample solvent Install a retention gap	More tailing for the eluting peaks, or those closest the solvent front 3 to 5 meter retention gap is sufficient
Solvent effect violation for splitless or on-column injections	Decrease the initial column temperature	Peak tailing decreases with retention gas lines may need cleaning
Too low of a split-ratio	Increase the split-ratior	Flow from split vent should be 20ml / min or higher
Poor column installation	Reinstall the column	More tailing for the early eluting peaks
Some active compounds always tail	None	Most common for amines and carboxylic acids

Retention Time Shift

Possible Cause	Solution	Comments
Change in carrier gas velocity	Check gas velocity	All peaks will shift in the same direction by approximately the same amount
Change in column temperature	Check column temperature	Not all peaks will shift by the same amount
Change in column dimension	Verify column identity	Switched column?
Large change in compound concentration	Use a different sample concentration	May also affect adjacent peaks
Leak in the injector	Leak-check the injector	Achange in the peak size occurs also
Blockage in gas line	Clean or replace clogged line	Most common for split line. Check flow controllers and solenoids

Split Peaks

Possible Cause	Solution	Comments
Injection technique	Change technique	Erratic plunger depression or having sample in needle
Mixed sample solvent	Change to single solvent	Worse for solvents with large differences in polarity or boiling points
Poor column installation	Reinstall column in the injector	Usually a large error in the insertion distance
Sample degradation in the injector	Reduce the injector temperature Change to an on-column injection	Peak broadening or tailing may occur if the temperature is too low Requires an on-column injector